



In-Theater Health Surveillance: What's Hot, What's Not

**Force Health Protection Conference
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Colonel Ken Cox, USAF, MC, SFS

*Director, Force Health Readiness
Deployment Health Support Directorate
Office of the Assistant Secretary of Defense
(Health Affairs) Force Health Protection and Readiness*



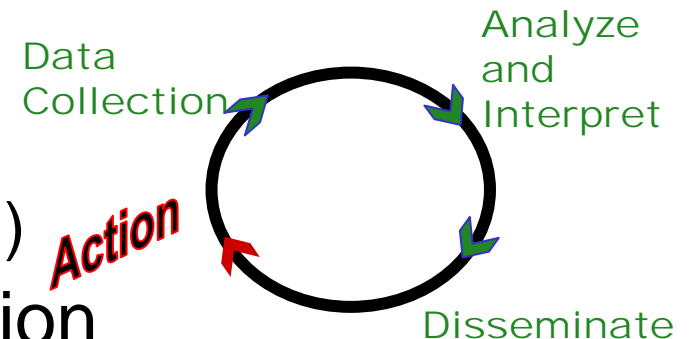
Outline

- Background
- In-theater Health Surveillance Systems
- Findings



Health Surveillance

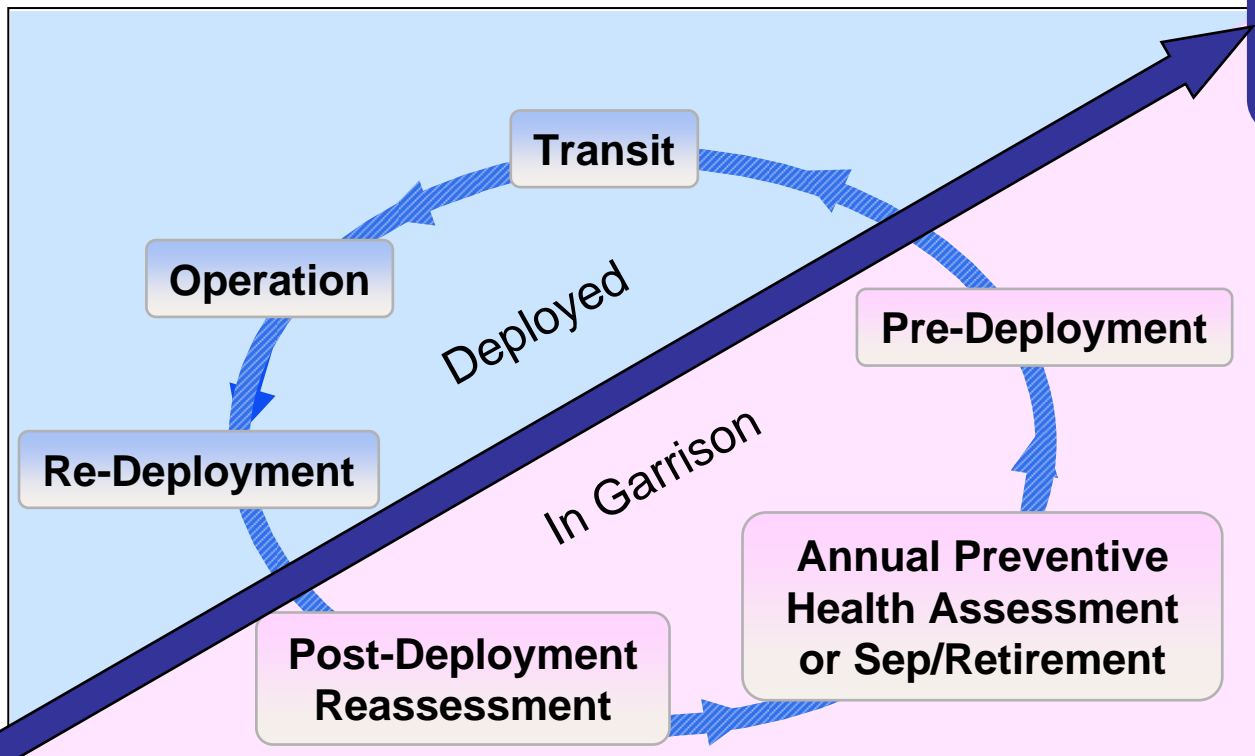
- Timely data flow
 - 'Accurate' data
- } Field Responsibility
- Appropriate analyses and interpretation with a goal of actionable information
 - Timely reporting to decision makers
 - Forward field unit
 - Intermediate command levels
 - 'Rear' top-level (AF, DoD, etc.)
 - Appropriate action/intervention
 - Continuous monitoring for effectiveness



Service Member Life Cycle

Health Assessment Opportunities

Force Health Protection

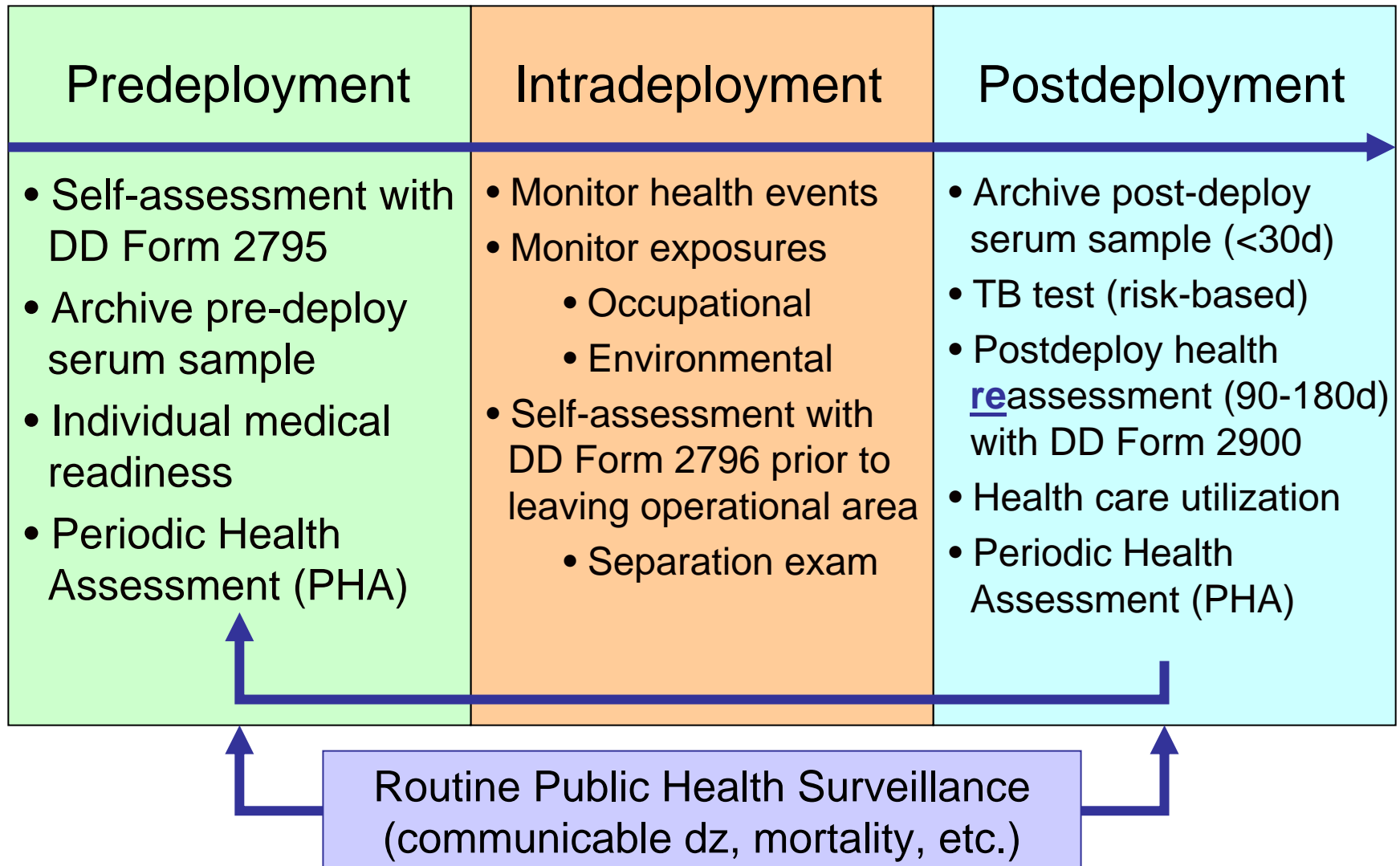


**Retirement/
Separation
&
Beyond**

Accession

Population Health

Deployment Associated Surveillance



Deployment Health Surveillance

- Outbreak detection
 - Health event surveillance
 - Diagnostic
 - Reportable events
 - “Syndromic”
 - Movement out of theater for medical reasons
 - Mortal events
 - Ancillary data, e.g., laboratory
- Occupational health exposure surveillance
- Environmental threat-based surveillance
 - Ambient
 - Operational, e.g., weapons of mass destruction



Existing Systems/Programs

- Casualty Reports (hostile injuries/deaths)
 - Personnel Component
 - Medical Component (AFIP Mortality Surveillance)
- Disease and Non-battle Injury Reports
 - Patient encounter modules (PEM) or web data entry
- Reportable Medical Events
- Joint Patient Tracking Application
- Medical Air Transport Reports (TRAC²ES)
- Other (Safety Reports, Trauma Registries, etc.)
- Post-deployment Health Assessments
- Occupational/Environmental Exposure Reports



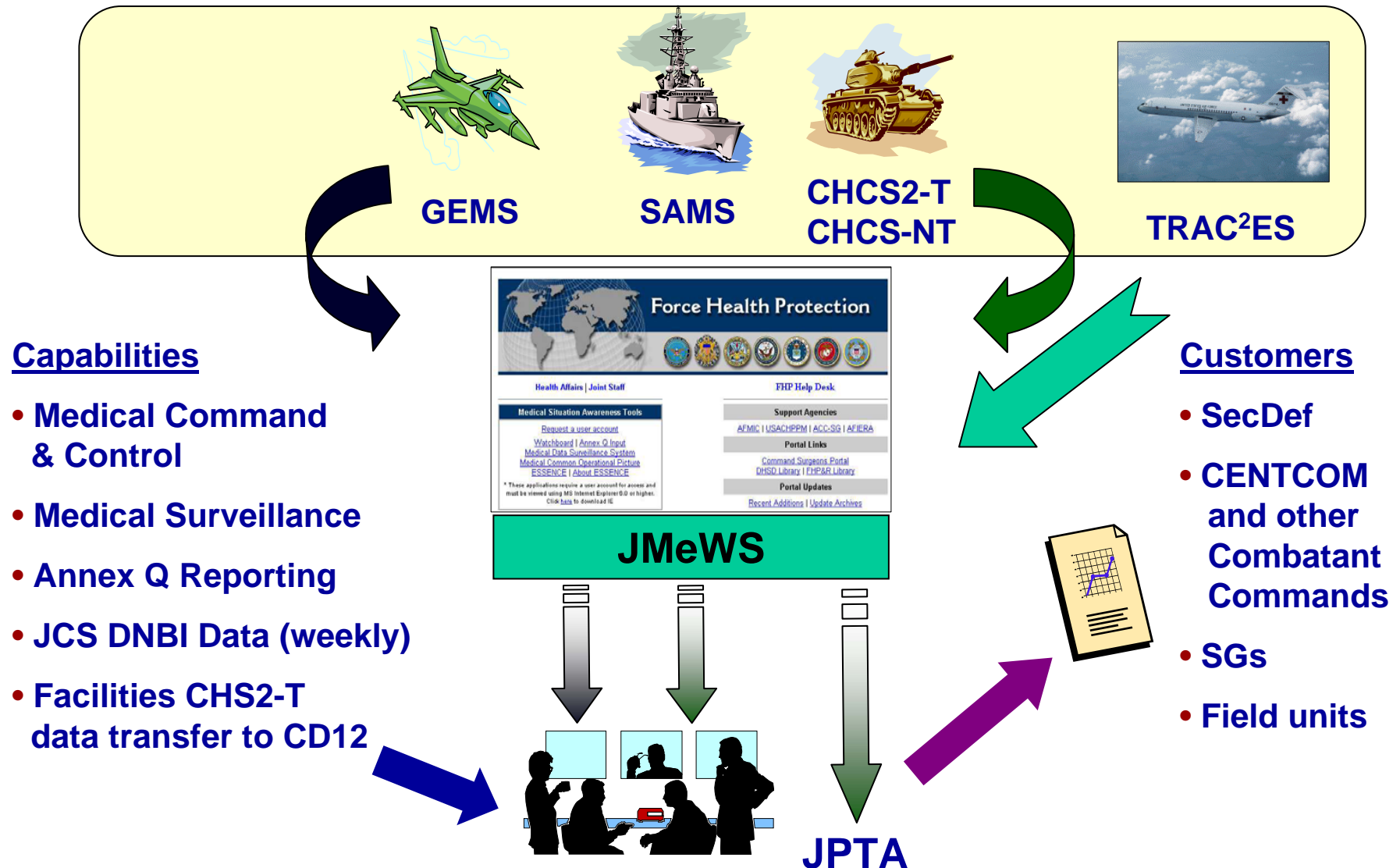
Casualty Reports

- Defense Military Data Center (DMDC)
 - KIA, Died of Wounds, WIA, RTD in 72hrs
 - Rapid reporting, but limited cause categories that are assigned by administrative staff
 - “Gold Standard” for public release
- Medical Component (AFIP)
 - DoD Mortality Surveillance
 - Full autopsy on every US service member who dies while on active duty
 - Results inform research, etc.



Theater Health Surveillance

Data Sources, Capabilities and Customers



JMEWS Medical Surveillance

- JMEWS has integrated a surveillance capability that uses Essence and a 2 and 3 z-score algorithm to generate an alert matrix as a point of departure for investigation.
- The data can be seen in the following combinations:
 - Rolled up into DNBI category
 - All MTFs within a specific DNBI category
 - All DNBI categories within a specific MTF
- Users can drill down through an alert and see the mapped encounter data that contributed to the alert.



JMEWS Medical Surveillance

JMEWS-II Application | Incident Count Details - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

https://localhost/msa-app/dnbsurveillance.do?subaction=pemssummary&entfNar

FOR OFFICIAL USE ONLY

TMIP | Joint Medical Workstation II

Welcome back, System Administrator
Home Page Manage Filters Help Logout

Unit Status Surveillance Map View AnnexQ Reporting Search Administration Preferences

Category View Unit View CPEG Patient Encounter Reports DNBI Static Reports

Your Location: Surveillance > Category View > Injury, Other Category Details

Your Filters: Default Filter, consisting of all 29 Units in the system. (Change filter) (View Units in filter)

Help with this page

Incident Count Details for Injury, Other Category 11/11/2004 at HMH 772 MAG 49 4TH MAW USMC (M01772)

The following matrix displays details about events of interest that have occurred in the Injury, Other category within the HMH 772 MAG 49 4TH MAW USMC (M01772) Medical Treatment Facility (MTF) on 11/11/2004. To see the records of the patients responsible for creating an alert, click on the ICD9 Code.

ICD9 Code	ICD9 Code Category	ICD9 Code Description	Last Name	First Name	SSN	Unit	Rank
807.02	FRACTURE OF RIBS STERNUM LARYNX AND TRACHEA	two ribs	Coombs	Laila	*****9455	M01772	UNKNOWN
717.40	INTERNAL DERANGEMENT OF KNEE	Derangement of lateral meniscus, unspecified	Prince	Gene	*****3783	M01772	SGT
717.40	INTERNAL DERANGEMENT OF KNEE	Derangement of lateral meniscus, unspecified	Topan	Reyna	*****4921	M01772	SGT

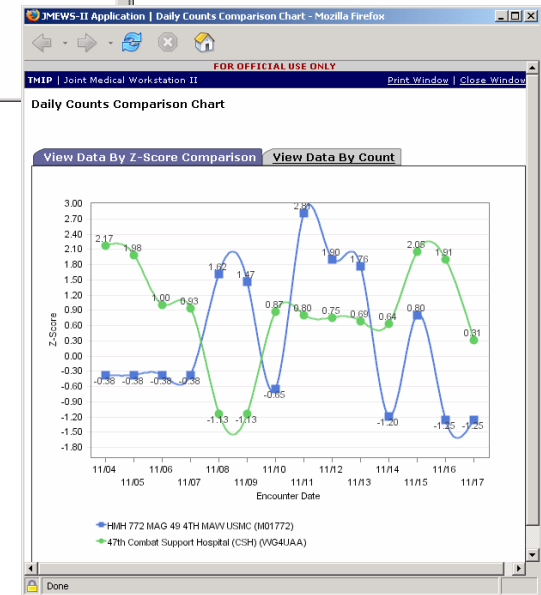
Export options: Excel | XML | CSV

This is a DOD interest system and is subject to monitoring.
Comments, questions or bug reports about this prototype? Email Matthew Pauls (mpauls@akimeka.com).

Done

Users can either drill down again to see a list of encounters and then the specifics of each actual encounter...

...or they can view some visual tools that help put the data in context.



Patient Tracking

Data Sources, Capabilities and Customers



**Direct Input at
Echelons III-V**

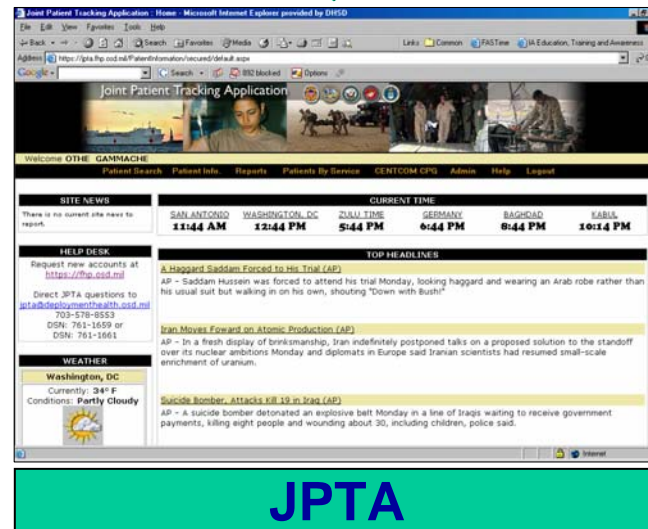
Data Transfer from JMeWS
SAMS CHCS2-T GEMS
CHCS-NT (Near Future)



TRAC²ES

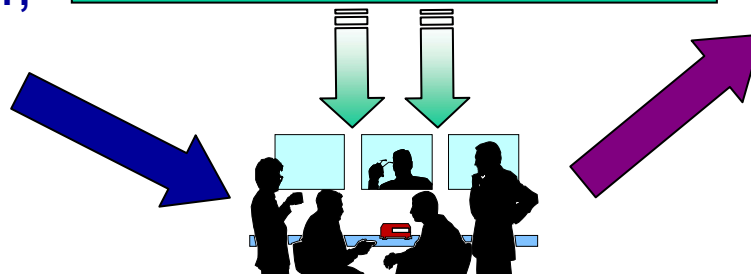
Capabilities

- Patient location and status – from theater to CONUS
- Healthcare provider treatment notes
- Extensive reporting at all levels – from theater, Europe and CONUS, down to unit and individual servicemembers



Customers

- Healthcare providers at echelons II-V
- CENTCOM
- Service liaisons
- Field units
- Service personnel offices
- Support to severely injured service-members and their families



JPTA Functionality

- Search for individual patients and see
 - Movement history, includes TRAC²ES data
 - Treatment history
 - Management history
- Routine reports for active and archived patient records
 - Various rosters of current patients – includes or excludes diagnosis information based on user access level
 - **Active Patient Report** – All current patients; view all patients at your facility; does not appear on menu for access levels other than facility access; can be exported into an Excel spreadsheet
 - **Inpatient Report** – All current inpatients at your facility, listed alphabetically; can be exported into an Excel spreadsheet
 - **Outpatient Report** – Current outpatients at your facility; can be filtered by gender, or can display all patients alpha order; can be exported into an Excel spreadsheet
 - Various graphic reports (Top 10 or Top 20 by ICD-9, by Component, etc.



Environmental & Occ Exposure Data

- Does not flow out of theater in real-time
- Most of the original data is hard copy and must be entered into databases manually
 - GEMS has an occ & environmental module
 - DOEHRS-T is the planned long-term solution
- Sampling capabilities and frequency varies from site to site
- Perceived exposure info available from DD Forms 2796 (post-deployment survey)





Deployment Surveillance

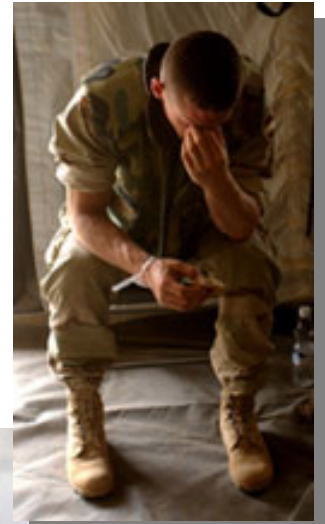
Sample Reports & Findings



Disease and Non-Battle Injuries (DNBI)

CENTCOM (OEF/OIF) Combined

- **Overall DNBI rate – 4% per week**
 - Injuries, all types 25%
 - Training/Work 44%
 - Sports 16%
 - Heat/Cold 3%
 - Motor Vehicles 2%
 - Other 35%
 - Respiratory 14%
 - Dermatologic 12%
 - Gastrointestinal 7%
 - Mental Health 3%
 - Combat Stress 2%
 - All other categories 37%

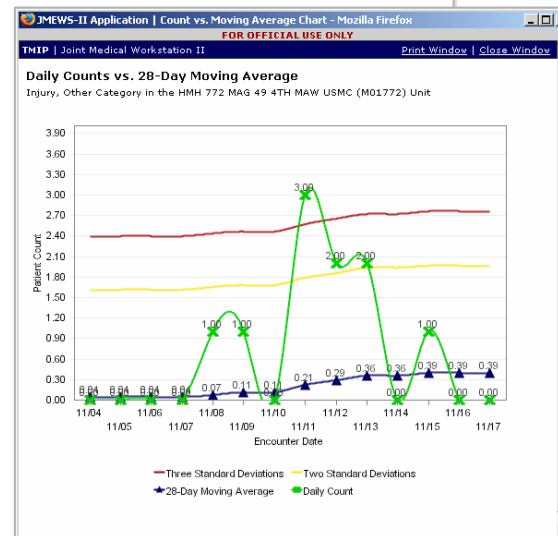
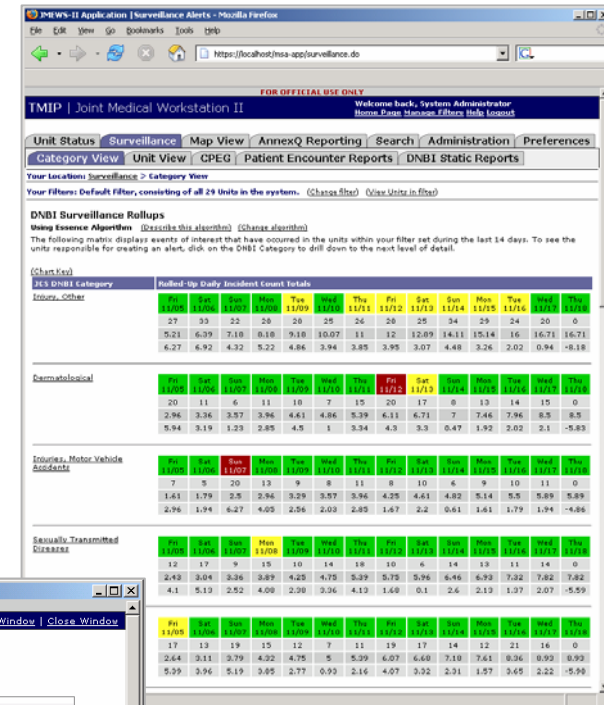


Data Source:
Air Force Institute of Operational Health
As of 17 June 2006

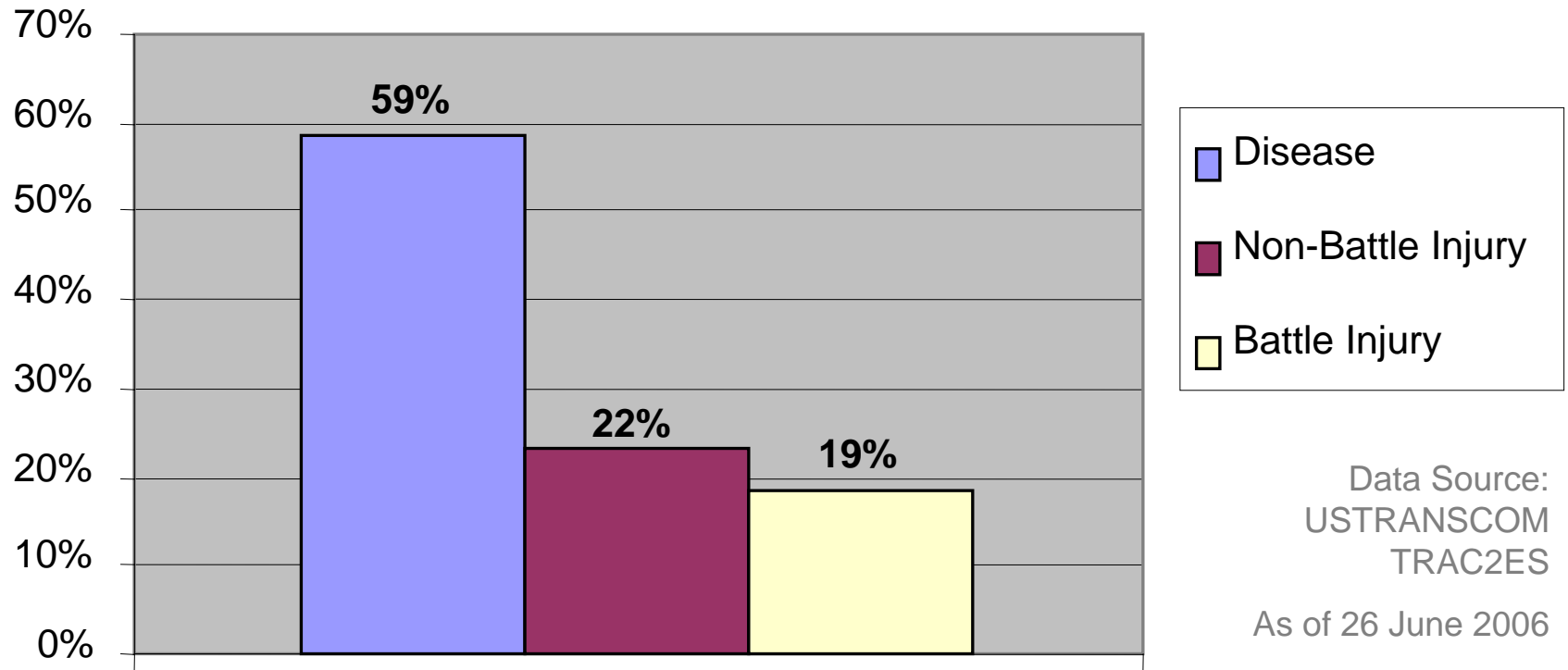
JMEWS Surveillance Reports/Data

OEF/OIF PEM data from CHCS2-T & GEMS-Top 10 ICD-9

1. Acute upper respiratory infection
2. Back disorders
3. Gastroenteritis
4. Joint disorders
5. Ankle/foot injuries
6. Essential hypertension
7. Exams, miscellaneous
8. Contact dermatitis
9. Tobacco dependence
10. "Common cold"



Medical Air Transports of Individual Servicemembers



From 2001-2006, the total MATs of individual servicemembers = 33,874

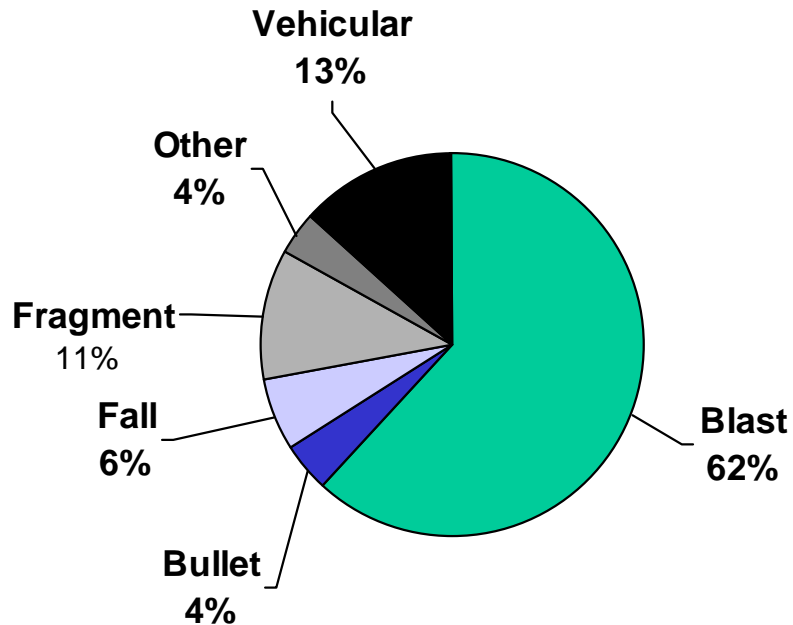
DoD AMPUTEES in OEF and OIF

- 686 Total Amputations as of 01 June 2006
- Most Common Causes
 1. *IED (42%)*
 2. *Accident (9%)*
 3. *Blast (8%)*
 4. *Rocket propelled grenade (8%)*
 5. *Gunshot wound (6%)*
- Outcome/Disposition
 1. *As of 19 Apr 06, 195 SMs with limb loss had completed MEB/PEB with 34 (17%) able to continue in military service*
 2. *25 of 34 returned to their original career field*

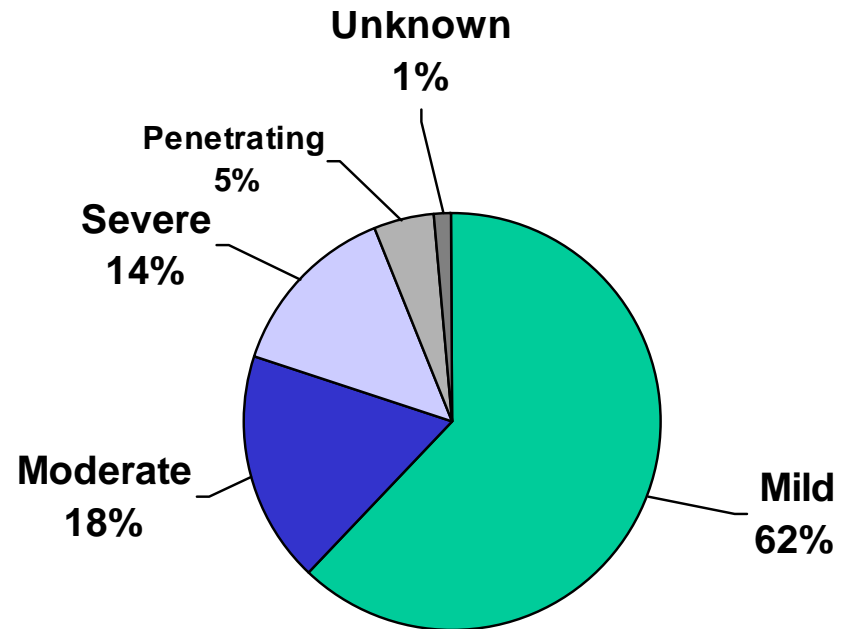


Traumatic Brain Injury

TBI Injury Mechanism



TBI Severity of Injury



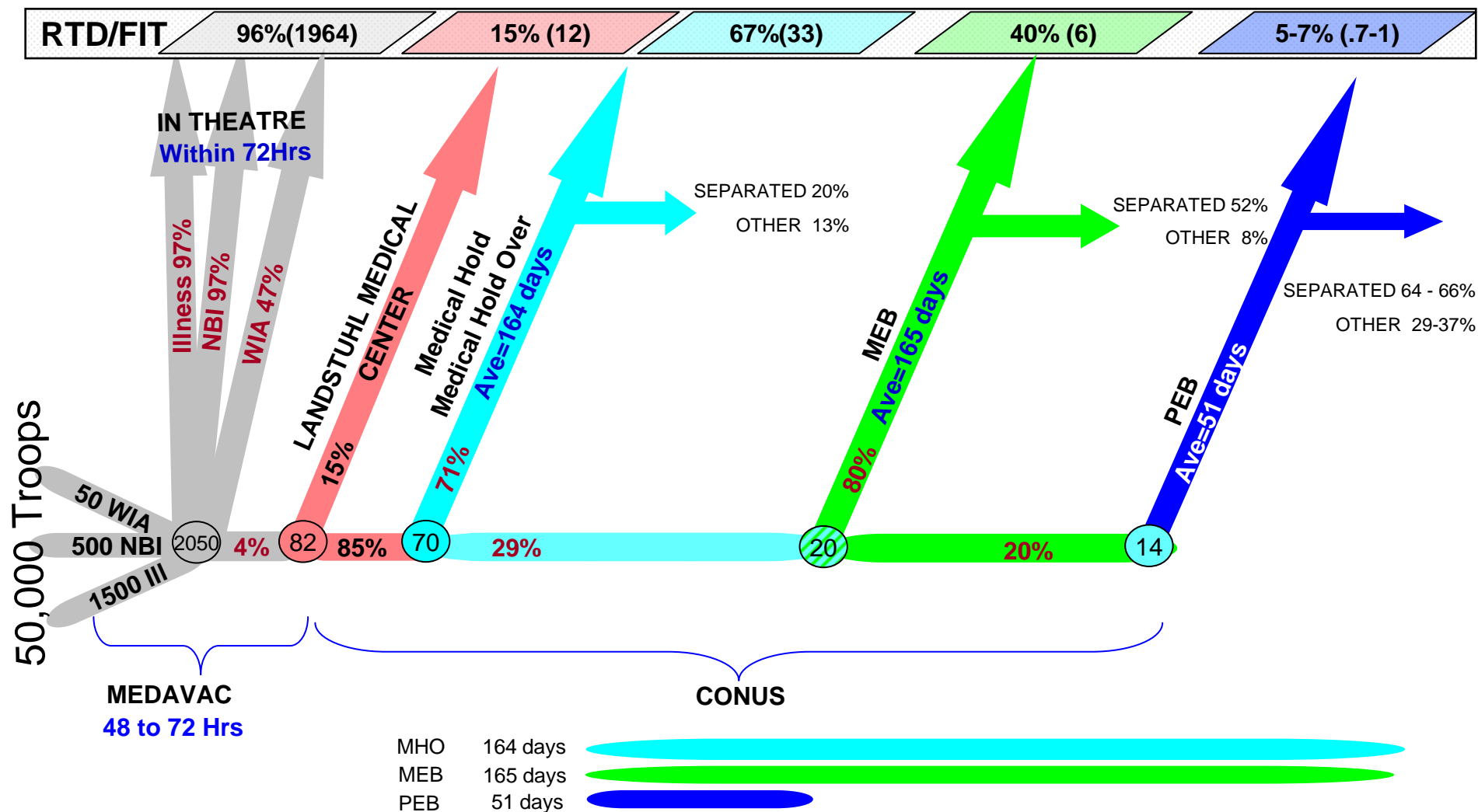
- Spectrum of TBI range from mild to severe, grand total=1,179
 - Most (763 or 62%) are mild
- Operational breakout, OIF (96%), OEF (4%)

Data from Defense Veterans Brain Injury Center, as of 30 Apr 06

Disposition of Ill and/or Injured Soldiers in OIF

Estimated Based on Historical Data

(1 January 2003—31 January 2005)



Summary of OIF/OEF Selected Exposure Incidents

- **Al-Samawah, Iraq**
 - Alleged DU contamination (442nd MP)
 - Extensive environmental sampling and medical surveillance (no DU exposures identified)
- **Al Mishraq Sulfur Plant/Mine Fires**
 - Approx 2500-3000 US personnel exposed to sulfur dioxide and hydrogen sulfide
 - Extensive environmental monitoring and medical surveillance
 - Possible long-term effects under investigation
- **Qarmat Ali Water Treatment Plant**
 - Possible sodium dichromate and PCB exposures involving about 250 personnel
 - Extensive environmental sampling and medical surveillance
 - No expected long-term health effects



Bringing it All Together



Questions and Discussion

Background Material



Disease Non-battle Injury (DNBI)

JCS-Mandated Categories (Weekly)

Dermatologic

GI, infections

Gynecologic

Ophthalmologic

Psychiatric

Combat stress

Respiratory

Intimate diseases

Fever, >24 hours

Neurologic (new)

All other, med/surg

Injuries, heat/cold

Injuries, sports/recreation

Injuries, motor vehicle

Injuries, work/training

Injuries, other

Problems:

Static since inception (1998)

Data 10-14 days old when analyze

This won't detect WMD attacks

Solution?—Special Surveillance

CENTCOM Special DNBI Surveillance Categories (Daily)

Category	Definition
Systemic Fever	Unexplained temp > 38C (100.5F) for 24 hours or a history of chills and fever without a clear diagnosis. Includes flu-like illnesses with fever and multiple systemic complaints (such as cough).
Lower Respiratory Illness	Bronchitis, pneumonia, new onset reactive airway disease, pleurisy, or respiratory difficulty of unclear etiology
Infectious GI	Any infection primarily manifested by vomiting and/or diarrhea.
Dermatologic Unclear Cause	Skin infections, blisters, ulcers, etc.
Unexplained Neuro	Cases of altered levels of consciousness, cranial nerve dysfunction, muscle weakness

AFIOH DNBI Analyses for CENTCOM

<https://brooks.af.smil.mil/AFIERA/Default.htm>

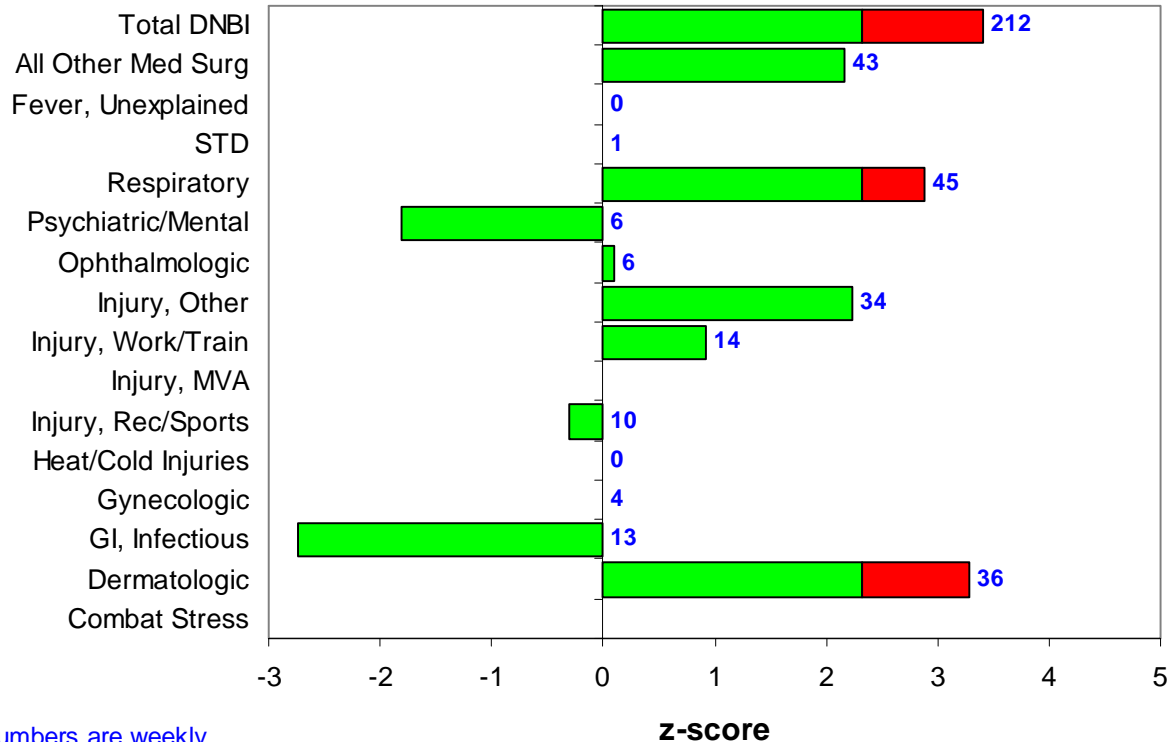


Location 'X'
Week Ending 17 Sep 2000

JCS DNBI Category

Decrease

Increase



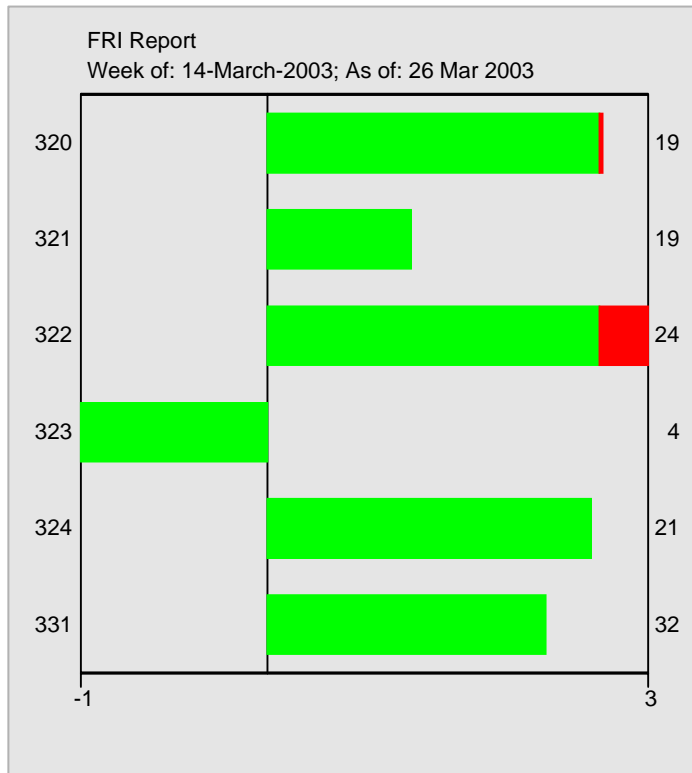
Note: Blue numbers are weekly

■ Within Historical Limits ■ Alert

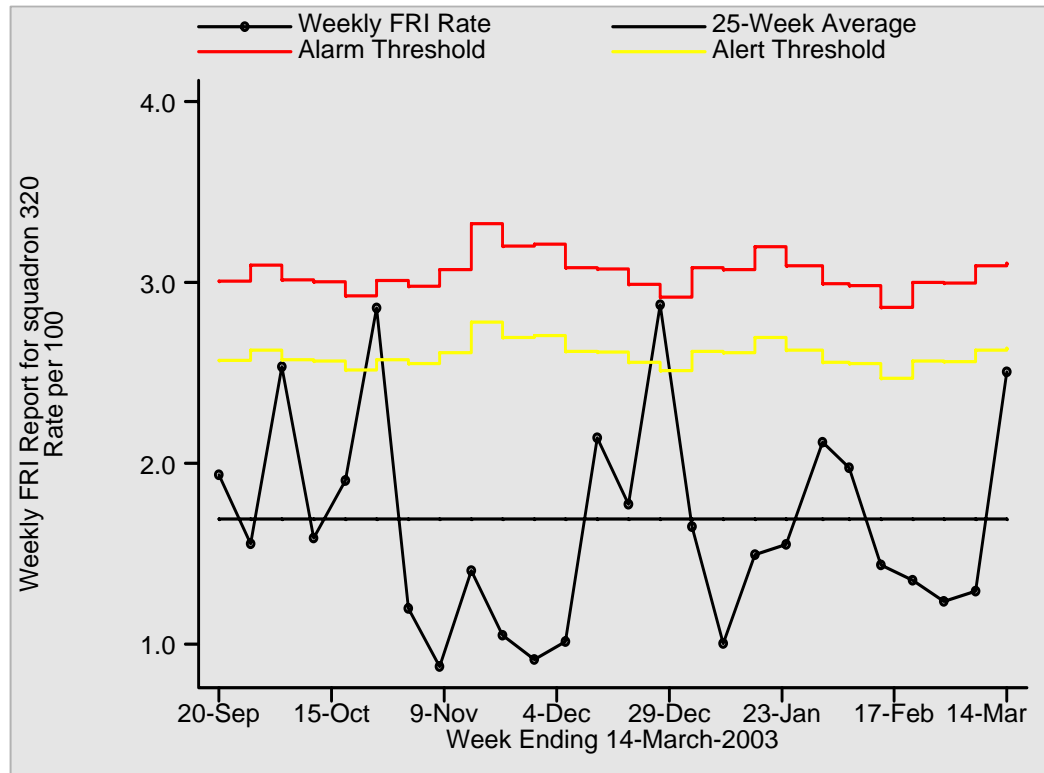
Data Interpretation

Complementary Chart Use

CPEG Chart



Process Control Chart



Joint Theater Trauma Registry (JTTR)

- On-site and downstream data collection on in-theater inpatients with traumatic injuries
- Collects all available data from first evaluation through definitive treatment
- Requires validation with medical records
- Goal is to determine primary cause
- Best suited to inform traditional research, best practices, etc.



Summary of OIF/OEF

Selected Exposure Incidents

- **Acinetobacter Infections – CENTCOM**
 - Excess morbidity and mortality
 - Extensive environmental sampling in medical treatment facilities and medical surveillance
 - More stringent infection control measures implemented
- **Al Tuwaitha Nuclear Research Center, Iraq**
 - Possible excessive radiation exposures
 - Extensive environmental monitoring; radiation doses to US personnel within acceptable doses
 - No long-term health effects expected
- **Camp Lemonier, Djibouti, Africa**
 - Possible exposure to PM¹⁰ and to acrolein from burning at landfill
 - Extensive environmental sampling and medical surveillance
 - No long-term health effects expected



Summary of OIF/OEF

Selected Exposure Incidents

- **Severe Pneumonia-USCENTCOM**
 - Throughout theater; epidemiologic assessment and extensive clinical work ups
 - No cause identified though seemed to be associated with smokers
- **Camp War Eagle, Iraq**
 - Possible airborne lead exposures
 - Extensive environmental sampling and medical surveillance (blood leads) – no excessive exposures identified
- **Ash Shuaiba Port, Kuwait**
 - Exposures to industrial pollutants such as particulate matter, sulfur dioxide, and carbon monoxide
 - Extensive environmental monitoring. No expected long term health effects.



Summary of OIF/OEF

Selected Exposure Incidents

- **Depleted uranium exposures from close-in fire incidents – Iraq**
 - Extensive, on-going DU medical surveillance program with over 2100 personnel assessed with a DU urine bioassay
 - Identified only eight servicemembers with confirmed DU exposures and one which is unconfirmed; all are known or suspected of having retained DU fragments
 - Veterans Affairs DU Medical Follow-up Program (Baltimore, MD)
 - Followed 80 Gulf War veterans with inhalational and/or retained DU fragment exposures for nearly 15 years. No adverse health effects detected due to DU's low-level radioactivity or chemical toxicity

